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SOME NEW NORTH AMERICAN LYCAENIDAE

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While I was rearranging my Lycaenidae to conform with the McDunnough List, I found it necessary to check some forms which were not determined. Some of these proved to be new. In this paper, I present descriptions of these new butterflies.

In the Edwards' collection I found specimens of both *Plebeius melissa* and *P. scudderi* labeled *scudderi*, but there are two males of *scudderi* that may be part of the series given to Edwards by Scudder and as such may be regarded as typical. The specimens figured by my late friend Dr. W. J. Holland on plate XXX of his "Butterfly Book" are not *scudderi*, but rather more closely allied to *melissa*.

Plebeius scudderi alaskensis new race

Male expanse, 24 mm. The ground color of the primaries of this race is a very light violet with a pink iridescence. The black margin is very narrow and the fringe is white. Below, the ground color is light gray-brown. There are the usual markings below; the submarginal lunules have a faded appearance, and the spots of the submesial row are greatly reduced or missing. This race is quite unlike the coastal race, *kodiak* Edwards.

Female expanse, 25 mm. Lower surface same as in the male. Upper surface heavily suffused with gray-brown scales. The usual marginal black and submarginal lunules of the species are present in this sex, but restricted in size. The yellow lunules, if present at all, are very narrow.

Holotype: male, VI-27-1916, Ft. Yukon, Alaska, J. A. Kusche, Carnegie Museum Collection; *allotype*: female, VI-10-1916, Ramparts, Alaska, Holland's "Butterfly Book," plate LXVI-14; *paratypes* 1-300; Ramparts, Circle, Ft. Yukon, Eagle City, Fairbanks, and College, Alaska; Dawson and White Horse, Yukon Territory.

Plebeius scudderi subarcticus new race

This race, like the preceding, is frequently confused with the coastal race *kodiak*. The three northern races are quite distinct.

Male expanse, 26 mm. The color of the upper side is deep purple as in *Plebeius yukona* (Holland). The marginal black band is not wide but is distinct. The lower surface is gray, heavily suffused with black scales; the suffusion increases in density toward the base. The usual spots and lunules are present and variable in size as is the case in the group as a whole. Body above black, below slate. Otherwise this race is the same as topotypical *scudderi*.

Female expanse, 27 mm. The marginal black band on the upper side extends inward almost to the base as frequently happens in the females of the races of *scudderi*. Otherwise the female is like the male.

Holotype male, *allotype* female, *paratypes* 1-13, Fairchild Point, Great Slave Lake, N. W. T., Canada, VII-22-1927; *paratypes* 14-42, South Shore, Great Slave Lake, N. W. T., Canada, VI-VII-1927. The specimen figured by Dr. Holland on plate LXVI-15 is one of the paratypes from Fairchild Point. The specimen on plate LXVI-13 is an example of a northern form of *Everes comyntus*.

***Plebeius scudderi sweadneri* new race**

This race is similar to the California race *lotis*. *Lotis* Lintner from Mendocino Co., Calif., is a great rarity and must not be confused with the more southern race of *melissa* that in the past few years has been distributed as *lotis*. I will take up this *melissa* race later in this paper.

Male and female, average expanse 25 mm. The upper surface of the male is blue with a purple sheen, quite unlike typical *scudderi* which occurs somewhat to the north of *sweadneri*. The black band is wide, but not as wide as in *atrappretectus* Field. Below in both sexes, the ground color is light tan suffused by green scaling at the base, whereas *scudderi* is light grey beneath. The usual black markings are very much like those of *lotis*.

The females on the upper side are dark brown as in *melissa*, but have a small blue-violet area at the base and very bright marginal lunules. The lower surface is like that of the male.

Holotype, *allotype*, and 75 *paratypes*, VII-23-1932, Uranus Peak, Shoshone Co., Idaho, altitude 5200 feet. The lot was taken by my good friend Dr. Walter Sweadner, Curator of Entomology of the Carnegie Museum.

***Plebeius scudderi fretchlini* new race**

This race is easily confused with *P. anna ricei* Cross from Oregon, but a careful study of the genitalia of the group reveals that it is not an *anna* but rather a *scudderi* race.

Male expanse, 25 mm. The upper side is the same as in *scudderi*, but some examples are more violet-colored. The under side is very unusual. The ground color is a bright greyish white with a very definite blue scaling in the basal areas. The submesial row of spots is reduced, frequently lacking in the secondaries. The pale orange marginal lunules are reduced to mere suggestions of markings and are sometimes lacking. All other markings of *scudderi* are lacking.

Female expanse, 28 mm. The female above is brown, with usually narrow pale markings. Below it is the same as in the male.

Holotype, *allotype* and *paratypes* 1-250, Paradise Valley, Mt. Rainier, Washington; *paratypes* 251-300, Cooney Lake, Washington. I have a few examples from Mt. Olympus, Washington, which I associate with this race. I take great pleasure in naming this race in honor of my good friend Mr. Don Frechin of Bremerton, Washington.

***Plebeius melissa paradoxa* new race**

This race of *melissa* has for years been passing for *P. scudderi lotis* Lintner, but a study of the genitalia of true *lotis* from Mendocino Co., Calif., reveals its true status and the true status of this race.

Male expanse, 25 mm. On the upper side, the male is a light blue with lilac reflections. The marginal band is very narrow. On the lower side the ground color is white with the usual black markings which are widely spaced. The orange lunules are not as wide as in Colorado *melissa*.

Female expanse, 27-29 mm. The females are larger and more clearly marked than in *melissa* and have wider marginal bands. As in the male, the black spots below are widely separated and larger than in *melissa*. The ground color is the same as the male ground color.

Holotype and *allotype*, Tehachapi Mts., Calif., VI-7-10-1927. *Paratypes* 1-150 from the Tehachapi Mts., Bouquet Canyon, Lebec, Fillmore, and Twin Peaks, California. The specimens figured by my friend J. A. Comstock, in his "Butterflies of California," plate 53, figures 23, 24, 25, are referred to this race. All the specimens I have examined were collected in the month of June.

***Plebeius melissa fridayi* new race**

This race is figured by Comstock on plate 53, figures 21 and 22, in his "Butterflies of California." The examples figured are very fine representatives of this race and will aid greatly in determining material.

Male expanse, 25 mm. The upper side is the same as in *melissa*. The under side is very striking. It is a dull grey-tan, with an overcast of greenish blue scales that are strong at the base but decreasing in intensity outwardly. The marginal lunules or patches are very large and a yellow-green color.

Female expanse, 28 mm. The female is like *paradoxa* except that the pale markings are narrower and paler, and the blue is brighter. The lower side is like that of the male.

Holotype, male, VII-27-1927, Mammoth, California; *allotype*, female, VII-27-1927, Mammoth, California; *paratypes* 1-50, Mammoth and Gold Lake, Calif., F. W. Friday, all taken in July. I take great pleasure in naming this race in honor of my good friend Mr. Friday of Los Angeles, who, in his few years on the West Coast has added so much to the knowledge of California butterflies.

***Plebeius ferniensis* new species**

Expanse of both sexes, 29 mm. The male is a blue-violet color, with a definite sheen of pink overcasting the wings on the upper side. The marginal black band is very wide, and the fringes are white. The under side is marked like well marked *anna* from the Lake Tahoe, California, district, but the ground color is almost brown, very much darker than in any member of this whole group of *scudderi*, *melissa* and *anna*. The females are plain brown above like *Satyrium fuliginosa*, and even more brown than the males below. Otherwise the females are the same as the males.

The genitalia of this species more closely resemble those of *anna* than of either *melissa* or *scudderi*.

Holotype, male, VII-16, Fernie, B. C.; *allotype*, female, VII-14, Fernie, B. C.; *paratypes* 1-10, VII-1 to 16, Fernie, B. C., all taken by C. C. Garrett.

***Everes texana* new species**

In 1920 a fellow Boy Scout, John Rock, took a trip with his parents to San Antonio, Texas. John and I had collected together for some time, and he promised to bring back all the specimens he "could get his hands on." He brought back several thousand specimens including a very long series of an *Everes* which he said seemed to swarm just outside of San Antonio. In 1932 I took some examples of this species with me to Washington for my late friend F. H. Benjamin to examine; he in turn referred them to Dr. Schaus who, after carefully examining the specimens and comparing them with his Mexican and Central American material, declared they represented a good species. I submit the description of this species.

Male expanse, 18 mm. The color of the upper side is an iridescence ranging from brown-gray to orchid. The fringes vary from grey to white. The margins are very dark brown on the primaries; on the secondaries occurs a series of small black marginal spots, faced inwardly by orange lunules in some specimens. The under surface is similar to that of *comyntus*. The marginal orange spots of the secondaries are very small and are frequently lacking. The black of the spots of *comyntus* is brown in this species.

Female expanse, 20 mm. Same as the male above except that the margins are very wide, frequently suffusing the whole wing. The brown is a lighter color than in the male. The lower surface is the same as in the male.

Holotype, *allotype*, and 1067 *paratypes*: VII-1920, near San Antonio, Texas.

***Glaucopsyche lygdamus mildredae* new race**

Male expanse, 25 mm. The upper side is blue instead of the light violet of typical *lygdamus* from Georgia. The black marginal band is narrow with a white fringe. The lower side is quite striking; the ground color is a dark slate, slightly lighter outside the usual row of submesial spots, and is overcast by blue-green scales on the basal area. The submesial spots are black surrounded by white.

Female expanse, 27 mm. The upper side of the female is the same as in the male except that the black border extends inwardly, suffusing the limbal and discal areas with black scales. A submesial row of white spots frequently appears on the secondaries. Both sexes are alike on the lower surface.

Holotype, *allotype* and 50 *paratypes*: Baddeck, Cape Breton Island, N. S., VI-17-1941. The holotype and allotype were taken by Mrs. Mildred Chermock on the small island off Baddeck on which Dr. McDunnough took the type lot of *Papilio bretonensis*. We found females depositing eggs on a small beach pea.

***Glaucopsyche lygdamus nittanyensis* new race**

Male expanse, 25 mm. The upper side is the same as in *afra*. The lower surface is a dark brown overcast by grey scales. The spots of the submesial row are large, black, and encircled by white. These spots are shifted from their usual position to a position very close to the margin, which is not the case in any of the other eastern races.

Female expanse, 27 mm. The female is the same as the male except that the dark marginal band extends over and into the limbal and discal areas.

Holotype and *allotype* in *coeta*, V-13-1940; *paratypes* 1-29, V-13-15-1940; *paratypes* 21-43, various dates, Bear Meadows, near State College, Pa.

This race is not rare, but due to its short flight period, many collectors miss it. It must not be confused with the race from western Pennsylvania which we call *lygdamus lygdamus* for lack of a better name.

***Mitoura sweadneri* n. sp.**

Expanse of both sexes, 25 mm. This species is grayish brown, with a slight greenish iridescence above, with an extra-median white band showing through on the secondaries of some examples. The fringes of the primaries are somewhat lighter than the rest of the wings, and are almost white on the secondaries. The lower side of the primaries are light brown, suffused with green. The extra-median interrupted white line is complete and shaded inwardly with brown as in *damon*. The fringe is greyish brown. There is a narrow, sometimes broken band of white on the margin inside the fringe, which on flown specimens may be mistaken for the fringe. The ground color of the secondaries is the same as that of the primaries, but the green suffusion is heavier. The tails are black, tipped with white. The fringe is grey. The inner angle is composed of a large black patch above which is fair-sized white spot. A fine black marginal line occurs as in *damon*. Internally to this occurs a narrow but distinct, continuous white line from the outer angle to the inner angle. Inward from this there is a blue field overcast with white scales. This field is widest at the inner angle and tapers off toward the outer angle. On the inner edge of this field, between medial veins 1 and 2, occurs a large black patch as in *siva*. Another black patch occurs at the upper end of the blue field. The zigzag extra-median white band is shaded like the same band in *siva*. It is shaded internally by a brown band. In the basal area there occurs two large white spots. In rare cases these two spots fuse into one elongated spot.

Holotype, *allotype* and *paratypes* 1-75, St. Augustine, Florida, VI-1940, Dr. W. R. Sweadner; *paratypes* 76-83, St. Augustine, Florida, VI-1943.

NEW NEARCTIC CRANE-FLIES (TIPULIDAE, DIPTERA), PART XXII.

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The preceding part under this general title was published in 1944 (Can. Ent. 76: 166 - 172). At this time I am characterizing some Eriopterine crane-flies from the three Pacific Coast states that were collected and sent to me by Messrs. Otto Degener, James A. Macnab, Axel L. Melander, Herman A. Scullen, and the late Millard C. Van Duzee. Except where indicated to the contrary later in the text, the types of the novelties are retained in my collection through the generosity of the collectors.

Erioptera (Psiloconopa) melanderi n. sp.

General coloration dark brown; antennae black throughout; wings with a strong blackish tinge, the oval stigma still darker; sparse but strong macrotrichia in outer ends of cells R_2 to 2nd A , inclusive; R_s shorter than distal section of R_5 ; R_{1+2} nearly twice M_{3+4} .

Female. Length about 5 mm.; wing 6 mm..

Rostrum brownish gray; palpi brownish black. Antennae black throughout; flagellar segments oval, the verticils subequal in length to the segments. Head brownish gray; anterior vertex relatively wide.

Pronotum brownish gray. Mesonotal praescutum brownish gray, somewhat darker in front; praescutal setae pale and sparse; posterior sclerites of notum brown, sparsely pruinose. Pleura brown, heavily gray pruinose; meral region large. Halteres weakly darkened. Legs with coxae dark brown, sparsely pruinose; trochanters brownish yellow; remainder of legs dark brown, the terminal tarsal segments still darker. Wings with a strong blackish tinge, the oval stigma still darker; veins darker brown. Sparse but strong macrotrichia in extreme outer ends of cells R_2 to 2nd A , inclusive, as well as the outer ends of cells R and R_1 ; a very few trichia in base of cell R_4 ; trichia of outer cells more sparse than in *pilipennis* and not continued as far basad in the cells. Venation: Sc_2 faintly preserved, subequal to or only a trifle shorter than Sc_1 ; R_s shorter than in *pilipennis*, less than the distal section of R_5 ; R_{2+3+4} nearly twice the arcuated R_{2+3} and distinctly longer than M_{3+4} ; R_{1+2} long and gently sinuous, nearly twice M_{3+4} ; $m-cu$ shortly before fork of M ; discal section of Cu_1 deflected very slightly cephalad at its outer end. In *pilipennis*, Sc_2 is atrophied or only vaguely preserved; R_s equal to or slightly longer than distal section of R_5 ; R_{2+3+4} nearly straight, only about one-fourth longer than R_{2+3} and shorter than M_{3+4} ; R_{1+2} straight, subequal to or only a trifle longer than M_{3+4} ; $m-cu$ at fork of M ; distal section of Cu_1 straight.

Abdomen dark brown, with sparse, scattered yellow setae. Ovipositor with the slender valves horn-yellow, darkened basally.

Habitat. California.

Holotype: ♀, Yosemite, June 12, 1935 (Melander). Type in my collection through kindness of Dr. Melander.

I am very pleased to name this species for Dr. Axel Leonard Melander, who has permitted me to study his extensive collection of Nearctic Tipulidae and related families. As indicated above, the closest relative is *Erioptera (Psiloconopa) pilipennis* Alexander, of northern Oregon, which differs in the pale wings and in the venation, as discussed above. It is evident that these two flies, with macrotrichia in the outer cells of the wings, are allied to other species that lack these trichia or have them much reduced. Such species center about *E. (P.) aperta* (Coquillett) and various allied flies in western North America. All of these species combine to form an isolated group of forms best distinguished by the unusually far distad position of Sc_2 when this latter element is preserved, in the latter case Sc_1 and Sc_2 being not greatly unequal in length. In the subgenotype of *Psiloconopa*, *meigenii* (Zetterstedt), Sc_2 is unusually retracted so that Sc_1 is almost as long as R_s .

***Ormosia (Ormosia) perspectabilis* n. sp.**

Size very large (wing, male, 8 mm. or more); antennae elongate, the flagellar segments only feebly dilated at bases; segments with an abundance of long pale erect setae; general coloration brownish gray; wings weakly tinged with brown, stigma darker brown but ill-defined; cell M_2 open by the atrophy of the basal section of M_3 ; anal veins convergent, 2nd A strongly sinuous on its outer third; male hypopygium with the tergite at apex produced into two conspicuous lateral lobes that are separated by a circular notch; inner dististyle terminating in a slender black spine; two pairs of blackened apophyses, one simple, the other unequally bispinous.

Male. Length about 6-6.5 mm.; wing 8-9 mm.; antenna about 6.5-6.8 mm.

Rostrum and palpi dark brown. Antennae elongate, about as long as the body, dark brown; flagellar segments elongate cylindrical, only feebly dilated at base; segments with basal and subbasal verticils that are shorter than the segments; an abundant, very long erect pale pubescence scattered over the segments, these hairs about one-half the length of the longest segments. Head gray.

Pronotum grayish brown; pretergites restrictedly yellow. Mesonotum chiefly brownish gray, the praescutum with the usual stripes confluent; humeral region restrictedly obscure yellow, enclosing the large, pale brown pseudosutural foveae. Pleura reddish or brownish gray; dorsopleural region obscure yellow. Halteres yellow, the knobs a little more darkened. Legs with coxae and trochanters obscure yellow; remainder of legs brown, the tarsal segments somewhat darker. Wings broad, weakly tinged with brown; stigma darker brown but ill-defined; costal border a trifle darkened; veins brown. Venation: Sc_1 ending beyond level of R_2 , Sc_2 at near two-fifths the length of Rs , the latter straight, subequal to R_4 ; R_2 variable in position, in the type being very close to fork of R_2+3+4 , obliterating R_2+3 ; in the paratype, nearly its own length beyond this fork; cell M_2 open by the atrophy of basal section of M_3 ; petiole of cell 2nd M_2 subequal to or shorter than $m-cu$, the latter at or close to the fork of M ; anal veins convergent, 2nd A strongly sinuous on its outer third.

Abdomen dark brown, in the type with the more proximal sternites a little more brightened; hypopygium slightly paler brown than the remainder of abdomen. Male hypopygium with the tergite large, narrowed outwardly, at apex produced into two conspicuous lobes that are separated by a rounded notch; lobes pale at distal ends, provided with abundant dense setae. Basistyle relatively stout, at apex on outer side produced into a short lobe. Outer dististyle relatively small, flattened, its lower surface filled with pale membrane, the outer portion blackened. Inner dististyle about twice as long, widened outwardly, the apex truncated, the outer angle further produced into a long slender black spine, at base of which is a fingerlike lobe. Phallosome consisting of a shield-shaped central mass that is produced at apex into a short acute point; two pairs of apophyses, one a simple black rod arising from an expanded base, the other strongly but unequally bispinous at apex.

Habitat. Oregon.

Holotype: ♂, Boyer Station, near McMinnville; shrub association, September 20, 1936 (Macnab); Collector's No. 24. *Paratopotype:* 1 ♂, swept from low western hemlock, Sept. 29, 1934 (Macnab).

Ormosia (Ormosia) perspectabilis is very distinct from all other regional species having elongate antennae in the male sex. From all such, including *O. (O.) monticola* (Osten Sacken) and *O. (O.) taeniocera* Dietz, it is readily told by the unusually large size and by the structure of the male hypopygium.

***Ormosia (Ormosia) sequoiarum* n. sp.**

Belongs to the *flaveola* group; general coloration, including body, antennae, halteres and legs, uniformly black; wings relatively broad, strongly tinged with blackish; male hypopygium with the outer dististyle acutely pointed at apex; phallosome broadly obtuse at tip, the aedeagus stout.

Male. Length about 3.5-3.6 mm.; wing 3.8-4 mm.

Female. Length about 4 mm.; wing 4 mm.

Rostrum and palpi black. Antennae short, black; flagellar segments very short-oval to subglobular; verticils longer than the segments. Head dull black.

Thorax uniformly black, the surface subnitidous; praescutal setae erect, relatively short and stout. Halteres and legs black throughout. Wings relatively broad, with a strong blackish tinge, the veins a little darker than the ground; macrotrichia black. Macrotrichia of cells relatively sparse but distributed uniformly over the surface, very sparse or lacking near the wing base. Venation: R_2 at fork of R_2+3+4 , variable in length, from about one-third to two-thirds as long as R_2+3+4 ; cell M_2 open by atrophy of m ; $m-cu$ at fork of M or a short distance beyond; anal veins divergent, cell 2nd A wide.

Abdomen, including hypopygium, black, the surface subnitidous. Male hypopygium of the general type of this group. Ninth tergite with central portion moderately produced, truncate, the oblique sides with unusually long and dense erect setae. Outer dististyle rather broadly flattened, its tip acute, the whole outer face microscopically roughened. Inner dististyle longer than the outer, nearly parallel-sided, the tip very obtuse to subtruncate; surface of style with numerous scattered pale setae over the entire length of the lower half. Phallosome with apex broadly obtuse; what seems to represent the aedeagus is a stout black central rod, its tip rather narrowly obtuse.

Habitat. California.

Holotype: ♂, Sequoia National Park, one-fourth mile northwest of Beetle Rock, June 8, 1942 (Degener). *Allotopotype:* ♀, with the type. *Paratopotypes:* ♂ ♂, ♀, June 6-8, 1942.

Ormosia (Ormosia) sequoiarum is readily told from other regional species of the group by the uniform black coloration of the body and appendages. The nearest relative is *O. (O.) absaroka* Alexander, of the central and northern Rockies, which differs especially in the coloration, the longer and narrower wings, and in slight details of structure of the male hypopygium.

***Ormosia (Rhypholophus) hoodlana* n. sp.**

Mesonotum chiefly gray or brownish gray; rostrum, basal segment of palpus and scape of antenna yellow; knob of halteres infuscated; femora and tibiae yellow; wings faintly yellow, the oval stigma brown; male hypopygium with the outer dististyle unusually expanded, the two arms subequal, the lower one unusually long and narrow; inner dististyle relatively narrow, boomerang-shaped; gonapophyses blackened, appearing as powerful straight rods that are unequally bifid at their tips, the mesal end of the rod further produced into a slender, strongly curved hook; arms of aedeagus relatively short.

Male. Length about 6.5 mm.; wing 7 mm.; antennae about 1.4 mm.

Female. Length about 6.5-7 mm.; wing 7-8 mm.

Rostrum obscure yellow; first segment of palpi yellow, succeeding segments dark brown. Antennae with scape obscure yellow; pedicel light brown; flagellar segments passing through light brown to darker brown or brownish black; basal flagellar segments short-oval, the outer ones elongate, with conspicuous verticils. Head dark gray.

Pronotal scutum obscure yellow, more pruinose in front; scutellum and pretergites yellow. Mesonotal praescutum with a broad central brownish gray

stripe, the lateral portions lighter gray; humeral region more obscure yellow; pseudosutural foveae and tuberculate pits black; posterior sclerites of notum gray, the scutal lobes more darkened; posterior margin of scutellum and region of wing-root brighter. Pleura and pleurotergite yellow or testaceous yellow, weakly patterned with brown on ventral sternopleurite. Halteres with stem yellow, knob infuscated. Legs with coxae and trochanters yellow; femora and tibiae yellow, the tarsi passing into brown. Wings with a faint yellowish tinge, the oval stigma brown; a vague darkening along the cord, best evidenced by a deepening in color of the otherwise brown veins; veins in prearcular and costal fields clearer yellow. Venation: Sc_1 ending nearly opposite R_2 , close to or just beyond the fork of R_2+3+4 ; cell 1st M_2 closed; vein 2nd A sinuous on distal third.

Abdominal tergites brown, sternites yellow; hypopygium brown. Male hypopygium with the outer dististyle unusually expanded, the two arms unequally developed, the lower one unusually long and narrow; vestiture of style relatively short and inconspicuous though abundant. Inner dististyle a slender boomerang-shaped structure. Gonapophyses powerfully developed, unusually divergent, to form a transverse bar; apophyses nearly straight, blackened, unequally bifid at tips, the inner angle a powerful spinous point, the outer or axial spine smaller to much reduced; mesal end of each apophysis further produced into a slender, very strongly curved black hook. Arms of aedeagus relatively short.

Habitat. Oregon.

Holotype: ♂, Hood Rapids, Mount Hood, July 29, 1921 (Melander); Melander collection. *Allotopotype:* ♀. *Paratopotypes:* 1 ♂, 1 ♀.

Ormosia (*Rhypholophus*) *hoodiana* is quite different from the other known regional species of the subgenus, differing especially in the hypopygial characters, as the outer and inner dististyles and the gonapophyses. These latter somewhat suggest the condition in *O. (R.) bifidaria* Alexander, of the central and southern Rockies, yet are quite distinct in all their details. Edwards has revived the subgenus *Rhypholophus* Kolenati to receive the species of the so-called *varia* group of species (type, *phryganopterus* Kolenati), based almost entirely on the bifurcate aedeagus of the male. For convenience of grouping, at least, it seems advisable to recognize this subgeneric name, though, as I have pointed out elsewhere, there are numerous other groups of *Ormosia* that show fully as well-marked characters, yet would be almost impossible to define in the female sex. In *Rhypholophus*, as here recognized, there are four or five species in Europe and more abundant species in western North America, yet none has as yet been discovered in the very rich *Ormosia* fauna of China and Japan, nor does any species occur in eastern North America.

***Ormosia* (*Rhypholophus*) *oregonica* n. sp.**

Allied to *suffumata*; general coloration of thoracic notum dark brownish gray, restricting the pale ground color; legs pale brown, the terminal tarsal segments black; wings light brown, the stigma darker, preceded and followed by somewhat paler areas; cell 1st M_2 closed; vein 2nd A very strongly sinuous; male hypopygium with the inner dististyle slender; gonapophyses with outer angle of outer plate unequally bidentate; arms of aedeagus relatively short.

Male. Length about 6 mm.; wing about 6.7 mm.

Head broken.

Prothorax brown, heavily gray pruinose; pretergites yellow. Mesonotal praescutum with the buffy yellow ground color restricted to the humeral and lateral portions, the remainder of disk almost covered by three brownish gray stripes, the interspaces slightly paler and barely indicated except by dark setigerous punctures; pseudosutural foveae dark reddish brown, tuberculate pits black; posterior sclerites of notum dark brownish gray, the scutellum more red-

dened, darker medially at base. Pleura with ground color reddish, most evident as a central longitudinal stripe, the dorsal and ventral regions more pruinose; conspicuous yellow setae on dorsal sternopleurite. Halteres with stem pale, knob broken. Legs with coxae yellow, sparsely pruinose, especially the fore coxae; trochanters yellow; remainder of legs pale brown, the outer ends of tibiae and tarsi passing into black. Wings with a strong light brown tinge, the stigma darker brown, preceded and followed by somewhat clearer yellow areas, involving the outer portion of cell Sc_1 ; prearcular field a little brightened; veins pale brown. Macrotrichia of cells abundant, becoming somewhat sparser in the bases of cells R , M and Cu . Venation: Sc_1 ending opposite R_2 , Sc_2 about opposite one-fourth the length of R_s ; R_2 close to fork of R_{2+3+4} ; cell 1st M_2 about as long as vein M_2 beyond it; $m-cu$ a short distance beyond fork of M ; vein 2nd A very strongly sinuous, cell 1st A widest just beyond mid-length.

Abdominal tergites dark brown, sternites yellow, the incisions of the outer segments slightly darker; ninth segment and hypopygium yellow, the outer dististyles blackened. Male hypopygium relatively short and broad, the caudal border emarginate, the sclerite very constricted at this point. Outer dististyle as in the subgenus, widely expanded outwardly. Inner dististyle unusually slender, narrower than in *suffumata*, especially at apex. Gonapophyses with outer angle prolonged into a broad plate that is unequally bidentate at apex; the inner spine large and strong, directed mesad; outer spine small, appearing as a shoulder on outer edge of plate; inner angle of apophysis produced into a long slender curved spine; in *suffumata*, the outer angle of the apophysis is a simple acute blackened spine. Arms of aedeagus shorter than in *suffumata*.

Habitat. Oregon.

Holotype: ♂, Crater Lake National Park, near Headquarters, altitude 6,400-6,600 ft., August 29, 1930 (Scullen); Oregon State College Collection.

The most nearly related species are *Ormosia* (*Rhypholophus*) *bicuspidata* n. sp. and *O.* (*R.*) *suffumata* Alexander, which differ especially in the genitalic characters, as above discussed.

Ormosia (*Rhypholophus*) *bicuspidata* n. sp.

General coloration of mesonotum brownish gray, the pleura chiefly gray; antennae with scape and pedicel brownish yellow, flagellum black; halteres yellow; femora and tibiae obscure yellow, the tips a little darker; wings brownish yellow, stigma medium brown; male hypopygium with the gonapophyses conspicuously bispinous, the outer spine relatively slender, at near midlength split into two very conspicuous, divergent, black spines; spine of mesal angle of apophysis long and slender; arms of aedeagus relatively short.

Male. Length about 5-6 mm.; wing 5.8-6.8 mm.; antenna about 1.5-1.7 mm.

Rostrum dark gray; palpi black. Antennae moderately long; scape and pedicel brownish yellow, flagellum black; flagellar segments oval, the outer segments more elongate; longest verticils unilaterally distributed. Head dark gray.

Pronotum dark brownish gray; pretergites very restrictedly obscure yellow. Mesonotum brownish gray, without clearly defined stripes, the lateral border and humeral region slightly more reddish yellow; pseudosutural foveae and tuberculate pits black; posterior sclerites of notum dark gray. Pleura brownish gray to clear gray, vaguely patterned with obscure yellow, especially around the wing-root and near the sutures. Halteres yellow. Legs with the coxae reddish brown, sparsely pruinose; trochanters obscure yellow; femora and tibiae obscure yellow, the tips, especially of the latter, a trifle darker; tarsi passing into black. Wings brownish yellow, the stigma medium brown, relatively distinct; veins light brown, more yellowed in the basal portion. Venation: R_{2+3} shorter than R_1 ;

cell 1st M_2 normally closed, in cases open by the atrophy of m (both wings of one paratype).

Abdominal tergites dark brown, sparsely pruinose; sternites yellow; hypopygium more orange-yellow, the appendages darkened. Male hypopygium with the outer dististyle strongly expanded outwardly, the lower angle stout, with the usual rows of spinous setae especially well developed. Inner dististyle moderately stout, the ventral edge paler than the remainder. Gonapophyses with outer angle a relatively slender stem that splits midlength into two very conspicuous black spines, these slightly unequal in length and thickness, strongly divergent; mesal outer angle of apophysis produced into a longer, more slender spine that is strongly curved at base. Arms of aedeagus relatively short.

Habitat. Washington.

Holotype: ♂, Castle Rock, Cowlitz Co., August 28, 1921 (Melander); Melander Collection. *Paratopotypes:* 3 ♂♂.

Ormosia (*Rhypholophus*) *bicuspidata* is quite distinct from the other species of the subgenus so far made known. The nearest ally seems to be *O. (R.) oregonica* n. sp., which is most readily told by the structure of the male hypopygium, specifically of the gonapophyses.

***Molophilus* (*Molophilus*) *millardi* n. sp.**

Allied to *nitidus*; size medium (wing, male, under 5.5 mm.); general coloration, including body, palpi, antennae and legs, black; head gray; knobs of halteres light yellow; wings with a strong blackish tinge; *m-cu* strongly arcuated; male hypopygium with the mesal lobe of basistyle bearing two slender spines; arms of both the outer and inner dististyles relatively short and stout.

Male. Length about 4.5-4.6 mm.; wing 5-5.3 mm.

Female. Length about 5.5 mm.; wing 6 mm.

Rostrum and palpi black. Antennae black throughout, relatively short; flagellar segments oval. Head gray.

Thorax almost uniformly black, the surface subnitidous; anterior lateral pretergites very restrictedly reddened; praescutal setae sparse, erect; pronotal bristles very long. Halteres with stem dusky, knob light yellow. Legs with coxae and tranchanters black; remainder of legs more brownish black; Wings with a strong, virtually uniform blackish tinge; veins and trichia still darker. Venation: $R_2 + a$ relatively long, R_2 lying some distance beyond the level of $r-m$; *m-cu* strongly arcuated, the inner end of cell M_4 lying proximad of the other elements of the cord; vein 2nd A relatively long, ending about opposite the basal section of $M_3 + a$.

Abdomen, including hypopygium, black. Male hypopygium of the general type of *nitidus*; furcula of ninth tergite with margin smooth. Basistyle with spines of mesal lobe two in number, small and slender; in *nitidus*, with a single powerful spine from a broad base. Outer dististyle with the arms relatively short, especially the more expanded outer blade which is roughly oval in outline, the slender inner arm also less elongate than in *nitidus*. Inner dististyle shorter and stouter, the apex suddenly narrowed into an acute point, not elongate and gradually produced. Gonapophyses (phallosomic plates) shorter and broader.

Habitat. California.

Holotype: ♂, Alpine, San Diego Co., April 8, 1915 (M. C. Van Duzee).

Allotopotype: ♀, April 11, 1915; *paratopotype:* 1 ♂, with the allotopotype.

I name this species for the collector, the late Mr. Millard C. Van Duzee, to whom I am indebted for many fine Tipulidae. It has become evident that there are several western Nearctic species of *Molophilus* that center about *nitidus* Coquillett. These species are best told by the details of structure of the male hypopygium, as above described. The Rocky Mountain and Great Basin *Molophilus* (*Molophilus*) *harrisoni* Alexander is even more distinct in its hypopygial characters.

THE EFFECT OF GROUND TEMPERATURE INVERSIONS UPON THE FLIGHT ACTIVITY OF *CULEX* SP. (DIPTERA, CULICIDAE).

The writer recently had occasion to collect numbers of *Culex* sp. in Toronto, at height intervals up to sixty feet. During the course of this work, there became evident a certain stratification of the flight-levels of the sexes correlated with a layering of the air temperature.

It is an observed fact that, on clear, calm nights, the air close to the ground cools by radiation to a greater degree than does the higher air. This is known as a ground inversion (i.e., temperature increasing rather than decreasing with height).

In collecting *Culex* sp., it was observed that, when the ground temperature was 68 F. or above, with a wind, both males and females were present within the lowest 20 feet. Males only were obtained at the higher elevations. Conversely, on calm nights, if the ground temperature dropped to 60 F., no males were present in the lower levels, but they were abundant at higher levels where the air temperature was 65 F. or more. The females remained in the lower levels still. If the mean temperature of the air column dropped below 60 F., no males were found, and females were present in the higher levels only.

The explanation of the above lies in the fact that the female of *Culex* sp. has a lower minimum flight temperature than has the male. When the mean temperature of the air column is high, the females remain in the lower levels, presumably for feeding purposes, while the males are fairly evenly distributed throughout the air column. With a ground inversion, the males are restricted to the warmer, higher air. When the mean temperature of the air column falls below the optimum or minimum flight temperatures of the males, they restrict or cease their flight. If there is an inversion present when this occurs, the females may still be active, and forsake the cooler, lower air, shifting their hunting range to higher levels.

The practical application of this is that a Toronto cliff-dweller may gain considerable relief from the heat on an unscreened porch on warm nights, but may experience considerable discomfort from mosquitoes on cooler nights on the porch. It seems probable that entomologists concerned with the flight activities of nocturnal insects would profit by considering the presence or absence of temperature inversions at the times of observations.

W. G. WELLINGTON,
Toronto, Ont.

OBSERVATIONS ON THE LIFE HISTORY OF *APAMEA VELATA* WLK

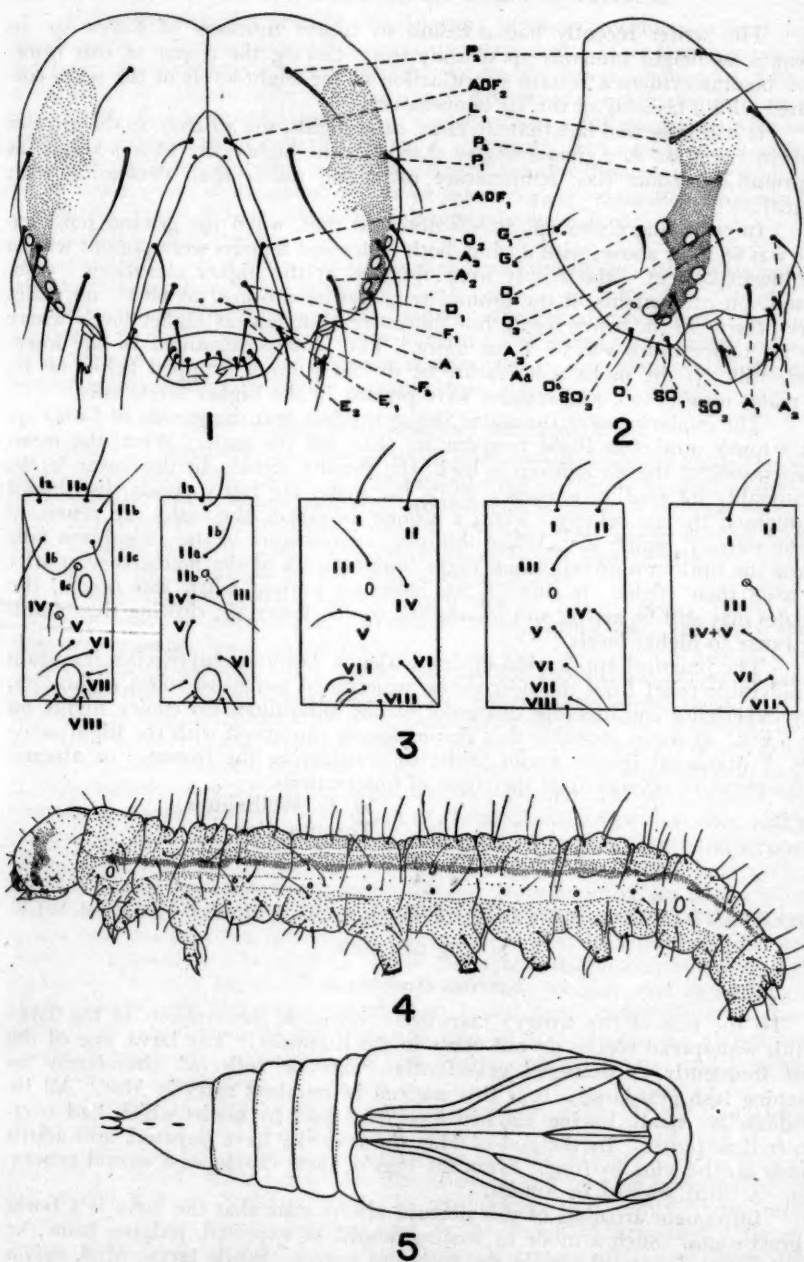
By V. G. DETHIER,

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To the best of the writer's knowledge, complete descriptions of the larva of this widespread species do not occur in the literature. The larva, one of the most frequently encountered grass-feeders, may be collected abundantly by sweeping lush grasslands. It is first noticed in numbers early in May. All individuals are small, having hatched from eggs laid by moths which had overwintered as pupae. By the end of May the majority have pupated, and adults appear on the wing in June. From the eggs of these develops a second generation. A third appears in August.

Infrequent accounts of this noctuid always state that the larva is a borer in grass stems. Such a mode of feeding would be expected, judging from the fact that closely related species are notorious borers. While larvae of *A. velata* may bore, they are preeminently external feeders. In the course of these studies several hundred larvae were reared in the laboratory where they fed exposed.

PLATE XIV



APAMEA VELATA WLK.

Observations in heavily infested fields also revealed innumerable larvae feeding in the open.

The following descriptions are based on studies of specimens collected in Massachusetts.

Last instar. Body cylindrical. No secondary hair. Prolegs on third, fourth, fifth, sixth, and tenth abdominal segments. Crochets uniordinal in a band. Prothoracic shield narrow, undivided, extended laterally to include IIc but not Ic. Spiracles oval. Prothoracic and anal largest. Skin finely granular, especially in areas between longitudinal white lines.

Setae moderately long, tapering, and usually transparent. Those on dorsum arise from indistinct sclerotizations. Sclerotizations not discernible at bases of others. I and II nearly on level on abdominal segments. Setae Ic and V of prothorax, IIb of meso- and metathorax, and III of ninth abdominal segment different from other setae. Arise from large sockets and are exceedingly thin and filamentous. III directed dorsad of spiracle on abdominal segments. IV behind and slightly ventrad. IV and V united on ninth abdominal segment. V directly below spiracle on abdominal segments. VI bisetose on prothorax; unisetose on remaining segments. VII bisetose on first abdominal segment, trisetose on second to sixth, unisetose on remaining segments.

Length of body 31 mm. Wide white stigmatal band. Thin white dorsal and para-dorsals. Area between these bands is a lighter powder green than remaining areas. Area between para-dorsal and stigmatal often suffused with fuscous. Here the rounded microscopic granules of the skin are more pronounced. Abdominal segments approximately equal width throughout. Legs normal. Hind coxae close. Tarsi and pretarsi long and tapering. Two prespiracular setae on prothorax. Subanal setae well separated.

Head height, 3.0 mm.; head width, 3.3 mm. Surface smooth and shiny. Light green. In some specimens there is no dark pigmentation. In others there is a dark fuscous band extending from the ocellar region toward the vertex. Its extent varies considerably. Greatest width at head at level of apex of adfrontals. Clypeus one-fourth longer than wide. Adfrontals indistinct. Notch of labrum shallow. P_1 and P_2 equidistant from median line. P_1 equidistant from P_2 and L_1 . ADF_2 short and separated. F_a close together. ADF_2 about equidistant from ADF_1 and P_1 , directly mesad of L_1 . ADF_1 nearer F_1 than to ADF_2 . No distinguishable ultra posterior setae or punctures. Anterior puncture (A_2^a) between A_2 and A_3 , nearer the latter. L_1 remote from A_3 . Ocellar setae grouped in equilateral triangle; O_1 between ocelli four and six; O_2 posterior to ocellus one; O_3 behind and above ocellus six. Ocellar puncture (O_a) posterior to ocellus six. Subocellar setae grouped in a triangle. Genal seta minute. Genal puncture anterior to seta. Mandibles heavily pigmented. Six ocelli.

Pupa. Length 15-17 mm. Smooth, shiny. No hairs except at cremaster. Greatest width in mesothoracic region. Other features are illustrated in figure 5.

Larvae become fully grown in approximately one month. At this time they retire to the bases of grass stems and among roots and other debris where they undergo pupation. They shrink to a length of 20 mm. Pupation requires from 10 to 14 days. During the prepupal and pupal periods the insect is subject to attack by fungi if the weather is inordinantly damp and to drying during drought.

EXPLANATION OF PLATE XIV

Fig. 1. Front view of the head of the larva of *Apamea velata* Wlk., showing the arrangement of the setae and a typical color pattern.

Fig. 2. Side view of the same.

Fig. 3. Setal map of the prothoracic, mesothoracic, first, seventh, and ninth abdominal segments.

Fig. 4. Last instar larva of *A. velata* Wlk.

Fig. 5. Ventral view of the pupa of *A. velata* Wlk.

NEW ASILIDAE AND MYDAIDAE (DIPTERA) IN THE SNOW COLLECTION*

BY D. ELMO HARDY,
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Bromleyus new genus

This genus is related to *Damalis* Fabricius. It is distinguished by having the dorsum of thorax clothed with very dense yellow pile (as in *Bombomina*); this pile is mostly erect and so dense that the ground color is almost concealed. The species of *Damalis* are more sparsely haired, with the pile mostly recumbent and not at all concealing the ground color. The third antennal segment is short, nearly orbicular in shape and the same length as the first segment; this segment is scarcely longer than wide; in the *Damalis* which the writer has studied the third segment is elongated, tapering to a point equal in length to first two segments and two times as long as wide. The front of *Bromleyus* has a sunken area running longitudinally between the bases of antennae and ocellar triangle, and the face has a distinct longitudinal furrow on upper one-third. The wing venation appears distinctive, the basal portion of vein M_2 is sharply bent at a right angle, this basal portion appearing like a crossvein and equaling three-fourths the length of the m crossvein; this condition makes the base of cell M_1 broad and square (fig. 1c). In *Damalis* vein M_1 is straight for its entire length, or if sharply curved near its base, this portion is not over one-fifth the length of the m crossvein; the base of cell M_1 is narrowed and pointed (fig. 2a). The anal cell has a short petiole in *Bromleyus*, equal to or slightly shorter than the r-m crossvein, and the apex of cell M_3 is rather narrow, about equal to length of r-m crossvein and scarcely half the length of the m crossvein. *Damalis* has a more elongate petiole on anal cell, nearly three times the length of r-m, and the apex of cell M_3 is broad, two times the length of r-m and about equal to the length of the m crossvein. The species at hand is very large and robust compared to the known American species of *Damalis*.

Genotype: *Bromleyus flavidorsus* n. sp.

The writer is pleased to name this genus after Doctor S. W. Bromley, the outstanding worker on the American Asilidae.

Bromleyus flavidorsus n. sp.

This remarkable asilid is allied to no other member of the family known to the writer; superficially it resembles some of the *Bombomina* because of the densely pilose mesonotum.

Female. The following are supplementary to those given under the generic description. *Head:* Front and face shining reddish brown in ground color; face blackish below; front yellowish pollinose on lower one-third and with a thin grayish line along the eye margins; face yellow-gray pollinose down the sides. Ocellar tubercle shining black, yellowish pollinose on sides; occiput densely yellow-gray pollinose. Mystax composed entirely of black hairs, extending almost to base of antennae; all of the hairs of the head black, except for sparse yellow hairs toward the back of the occiput and fine yellow pile at tip of labellum. Face not at all swollen, sunken below the eye margin and not visible from a lateral view (fig. 1a). The first two antennal segments are yellow-red, the third is chiefly black, slightly red at the base and apex; style yellowish red. First antennal segment one and one-third longer than the second; the style is about one-third longer than rest of the antennae (fig. 1b). Palpi brownish black, densely covered with strong black bristles. *Thorax:* Entire dorsum of thorax and scutellum densely yellow pollinose, the dense pile concolorous with the pollen. Pleura entirely brownish black, chiefly opaque, the upper portion of the mesopleura faintly shining. Propleura, mesopleura and hypopleura (as interpreted in Asilidae) densely covered with long black hair; upper portion of

*Contribution from Department of Entomology, University of Kansas.

sternopleura with rather sparse black hairs. Halteres reddish black. *Legs*: Black with a reddish tinge except for the bright yellow-red tarsi. Leg joints rather thick and short, femora and tibiae thickened apically and very densely covered with black hairs and bristles; all tibiae slightly arcuate. Tarsi with the bristles and pile concolorous with the ground color; all joints robust. Pulvilli yellow, claws black. *Wings*: Dull black. Crossvein r-m situated at about basal two-fifth of the discal cell; forking of R_4 and R_5 is beyond the fork of M_1 and M_2 (fig. 1c). *Abdomen*: Chiefly opaque black, the basal portions of terga three to seven subshining. Terga rather thickly black-haired on the lateral margins; the hair is very dense on the first two and extends rather sparsely over the dorsal portion. The eighth sternum is developed into a pair of rounding lobes on posterior lateral margins; these are covered with strong black hairs; this sclerite also has a pair of small median lobes on posterior margin, with a U-shaped concavity between. Genital portion of abdomen short and broad, not at all elongated.

Length: body, 18.0 mm.; wing, 14.0 mm.

Male unknown.

Holotype: female, Baboquivari Mts., Arizona, VII-24-1941 (R. H. Beamer); the specimen was taken in a dry mesquite habitat at about 3,000 ft. Type in Snow Entomological Collection.

Heteromydas new genus

This genus is related to *Opomydas* Curran and is distinguished by the following characters. The labellum of the mouth parts is elongate, developed as long as the oral opening (fig. 3a), instead of being short and globular, not over half the length of oral opening as in *Opomydas* (fig. 4b). The posterior tibiae of both sexes terminate in strong spurs at their apices (fig. 3d) instead of having moderately developed spurs in the males and apical spines in the females (fig. 4a). The face is more evenly swollen in the middle and has a distinct longitudinal furrow; in *Opomydas* the face is rather strongly swollen at the sides and the median portion is without a distinct furrow. The vertex is rather deeply excavated, entirely below the level of the eye margin, instead of being gently concave and gradually sloped from the eye margin. Vein R_5 ends free in the costa (fig. 3b), not coalescing with R_{1+2+3} at its tip as in *Opomydas* (fig. 4c). The male genitalia are proportionately small and little developed compared to *Opomydas*, being less than half as large as those structures of *O. limbatus* (Williston), specimens being approximately the same body size (figs. 3c and 4d; *H. bicolor* drawn to a scale two times greater than that used for *O. limbatus*); the structures protrude about half the length of the seventh tergum, instead of one and one-half times its length; the coxites each have a small secondary appendage at sides near bases (fig. 3c) instead of a long, slender straplike appendage toward the apical portion (fig. 4d), and the aedeagus is not greatly extended and folded back over itself as in *Opomydas*. The known species of *Opomydas* have the face, pleura, legs, humeri and margins of mesonotum chiefly yellow-red and the males have the abdomen and genital appendages covered with fine whitish hairs; *Heteromydas* has the head, thorax, abdomen and legs black and the abdomen and genitalia with rather stout black bristles.

Genotype: *Heteromydas bicolor* n. sp.

Heteromydas bicolor n. sp.

This species superficially resembles *Mydas ventralis abdominalis* Adams; the two are almost identically colored and are near the same average size. They are readily separated by the generic characters such as the presence of palpi; the more slender hind femora and weaker, not curved, tibial spurs; the presence of short stout bristles on hind trochanters; the elongated labella and furrow down the middle of face; the presence of numerous hairs on hind margin of mesonotum and very different genital characters in both sexes.

Male. Supplementary to the above mentioned characters: Completely black-haired. **Head:** Entirely black, covered with dense black pile. Facial groove extending to antennae, although it becomes rather indistinct on the upper portion; sides of face and front faintly gray pruinose, otherwise subshining black; face densely haired on the sides, entirely bare down the middle longitudinally. Front finely striated longitudinally, very slightly narrowed on upper portion, widest part about three times the length of the first two antennal segments. Occiput not prominent from lateral view. Labella thickly covered with short hairs projecting well beyond oral opening. First antennal segment three to four times the length of second, first two combined are about one-fourth the length of the third; third segment about one and one-half times longer than the greatly thickened fourth, their point of articulation is not well defined but appears just as a membranous portion separating the two (fig. 3a). **Thorax:** Subopaque black on the dorsum, subshining on the sides. Mesonotum with a pair of elongate gray spots just inside the humeri on the anterior portion and a pair of less distinct gray stripes on the sides; the median spots extend posteriorly into very faintly gray vittae which run to the scutellum, converging slightly on posterior portion of mesonotum; these vittae are so faint that they are only discernible in certain lights. Mesonotum and scutellum sparsely black-haired. Propleura, upper half of pteropleura and hind and upper margins of mesopleura rather thickly haired. Halteres entirely black. **Legs:** Joints rather slender, hind femora not greatly thickened, tibiae nearly straight. Femora with two to four rows of stout spines beneath; hind trochanters armed with five or more spines. Posterior tibial spur slightly longer than apical spines and much longer than width of metatarsi (fig. 3d). Metatarsi about equal to length of next three tarsal subsegments, hind metatarsi nearly four times longer than the tibial spurs. **Wings:** Chiefly brownish fumose, rather hyaline on posterior portion; most of the cells have elongate clear spaces in their middles, the clouding being heaviest along the veins. Venation as in *Mydas* and *Opomydas* with the first posterior cell widely open (fig. 3b). **Abdomen:** Chiefly rufous, first tergum and seventh and eighth sterna entirely black, first and sixth sterna and narrow lateral margins of abdomen usually with reddish brown to blackish discolorations. Second tergum with an elongate black spot on each side on posterior margin. Terga three to seven are yellowish on posterior margins. **Genitalia:** Chiefly black. Coxites and aedeagus with a slight reddish tinge. Ninth tergum cleft about four-fifths the length of the segment on median line, posterior lateral margins prolonged into a pair of elongate lobes. Cerci densely bristled upon the upper portions (fig. 3f). Coxites produced into a pair of strong, obtusely pointed, clasping structures, each having a small densely haired secondary lobe near basal portion below (figs. 3c, e). Aedeagus short and thick, not strongly produced.

Length: body, 24-16 mm.; wings, 17-18 mm.

Female. Differs but slightly from the male, the longitudinal vittae on the dorsum slightly more distinct and the sixth abdominal tergum, sterna and broad lateral margins of abdomen blackish. Genitalia with a circlet of broad blunt spines.

Length: body, 25-27 mm.; wings, 19-21 mm.

Holotype: male, Onyx, California, July 23, 1940 (D. E. Hardy); **allotype** female and fifty-four **paratypes**, thirty-eight females and sixteen males, same locality and date as type (R. H. Beamer, L. J. Lipovsky and D. E. Hardy), and one **paratype** female, Cajos Pass, California, Aug. 1, 1935 (Jean Russell).

All are in Snow Entomological Collection; paratypes will be presented to some of the larger museums.

EXPLANATION OF PLATE XV

1. *Bromleyus flavidorsus* n. sp. A, head, lateral view; B, antenna; C, wing.
2. *Damalis americanus* Curran. A, wing.
3. *Heteromydas bicolor* n. sp. A, head; B, apical portion of wing; C, male genitalia, lateral, length of drawing indicates 1.33 mm.; D, posterior tibia of female; E, male genitalia, ventral; F, ninth tergum and anal region, male.
4. *Opomydas limbatus* (Williston) (A-C drawn from type). A, posterior tibia of female; B, lower portion of female head; C, apical portion of wing; D, male genitalia (drawn from topotypical male), length of drawing indicates 4.60 mm.

AN INTERESTING OCCURRENCE OF *MUSCA DOMESTICA* L. LARVAE IN INFANT BEDDING

BY R. KEITH CHAPMAN,

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On August 10, 1943, the Guelph sanitary inspector brought into the Entomological Laboratory at the Ontario Agricultural College an envelope containing six dipterous maggots taken from a baby's mattress. The mother of the infant was very upset, as she had no idea what the "things" crawling out of her baby's mattress were, and was considering taking some action against the furniture company from which she had purchased the mattress only ten days previously.

The maggots ranged from 6 to 10 mm. in length, were very active, and had a blackish tinge due to the food which they had been getting. The larvae were determined as those of *Musca domestica* L., but to make certain of the species, they were placed in jars containing moist sand for rearing. Most of the maggots seemed ready to pupate and rapidly burrowed into the sand.

On making a trip to examine the infested mattress, the house was found to be surprisingly respectable and clean and not at all the sort of hovel which might be expected to be connected with such an infestation. The mattress was about 3 feet by 5 feet in size with a blue label attached, indicating its manufacture from converted material. The mattress was hanging from the clothes line and when moved a few maggots fell from it to the ground.

Stained marks on both sides of the mattress indicated that the baby had urinated on it to the extent of soaking it through from one side to the other. It was slit open along one side, revealing the fact that the material inside was damp through the mattress in an area with a diameter of about 9 inches. The filling material consisted of cotton and woollen waste of a general bluish-black colour, which no doubt caused the blackish tinge of the maggots which had been feeding in it. Holes in the stained area of the ticking indicated that flies and maggots had been coming out through it. A couple of larvae were seen coming through the ticking when the mattress was first observed, and the remains of pupal cases, found later, indicated that flies also had emerged through the covering. The maggots were only in the damp part of the mattress, which apparently was wet from urine as there was no odour of faeces present.

Six more maggots, ranging from 6 to 10 mm. in length, were obtained from the mattress. In spite of their small size compared with normal mature larvae of 12 mm., the larvae all seemed ready for pupation. This fact was no doubt caused by the scarcity of food, which has the effect of producing smaller larvae which pupate earlier and consequently produce smaller adults. These larvae were also placed in pupation jars for rearing purposes. No puparia were located in the mattress material in spite of the fact that a couple of emerging adult flies had apparently escaped from the mattress.

The next day, Aug. 11, puparia appeared in the jars containing moist sand, through which the maggots had been tunnelling. On Aug. 18 three adults emerged from the moist sand. Within the following three days six more flies emerged, all of which were identified as *Musca domestica* L. These adults, of which five were males and four females, were from 5.5 to 6.5 mm. in length. As mentioned above, starvation in the larval stage was no doubt the cause of this smallness in size.

A probable explanation of this rather unusual occurrence of the housefly and its comparatively short life history for this region may be as follows. A little carelessness with the baby and its bedding may be accounted for by the fact that both the mother and the father of the infant were working during the day, and a young girl was left in charge of the child. The baby urinated on the mattress and the sheets and blankets were thrown back to allow the mattress to dry, at which time the fly, attracted by the urine, deposited her eggs. With the added warmth of the child to keep the temperature high during the nights, the maggots developed very rapidly and due to the scarcity of food pupated earlier than usual. Under these conditions it is not surprising that the fly passed through a complete life history in the first ten days between the purchase of the mattress and the first appearance of the infestation in it.

Being unaware of any records of the housefly breeding in urine alone, and as there was some doubt as to whether the fly could come through on such a diet without the addition of faeces, a simple experiment was run. This test would also show whether or not the flies could have deposited their eggs and started the infestation in the mattress had it become damp or wet while in storage at the furniture store.

On Aug. 11 some absorbent cotton was placed to the depth of about 1 inch in a large glass jar 7 inches in diameter and 10 inches tall. The cotton was partially soaked with human urine, after which five adult flies were placed in the jar. Three days later about forty larvae 2.5 to 3 mm. long were crawling around in the urine and cotton and up the sides of the jar. The adults were removed as soon as the maggots appeared. Within six days after the adult flies had been placed in the jar, the larvae were from 8 to 8.5 mm. in length, or as long as those obtained from the baby's mattress. These maggots were white, in contrast to the blackish-tinged ones brought in from the colored mattress material.

Two days later the maggots seemed to be looking for some place to pupate by moving around restlessly and climbing up the sides of the jar. These larvae were plump and vigorous but within another week of much cooler weather they became smaller and thinner and took on a starved appearance. A little more urine was added and within three days the maggots were large and plump again. In another three days the maggots had again taken on their starved appearance. Thereafter the culture began to die slowly out as the absorbent cotton was allowed to dry out partially. More urine was added on Sept. 10 when very little activity was noticed in the jar. During the next month three adult flies emerged from the absorbent cotton, which by that time was perfectly dry. These adults, of which two were males and one female, were very small in size, measuring only 5.5 mm. in length.

On Aug. 16, nine adult houseflies were put in a jar, similar to the one mentioned above, with the same amount of absorbent cotton in it. Water equivalent to the amount of urine used in the first jar was added. This test was to see if the flies would lay their eggs on the moistened material and if so, how far the larvae would develop.

On Aug. 27, eleven days after the flies had been placed in the jar, a binocular inspection of the cotton showed no signs of eggs or larvae. A considerable amount of mould was present on top of the cotton moistened with water, whereas none had appeared in the bottle containing urine. A little urine was added

to the jar on Aug. 30 and six house flies were placed on it. Three days later numerous maggots 2.5 to 3.5 mm. in length appeared in the jar and began to grow rapidly. No attempt was made to bring these larvae through to adults. This test indicated, however, that house flies will not deposit eggs on water-dampened material containing no food. It is therefore unlikely that flies would lay their eggs on the mattress had it become damp during storage.

This was the second occurrence of maggots in a mattress in Guelph within a period of less than three weeks. In the other case the mattress was a large one, but a baby had been sleeping on it. The baby and mother were absent from the house at the time the infestation became apparent. A couple of girls staying in the house at the time became alarmed at the sight of maggots coming out of the mattress and the sanitary inspector ordered the mattress burned before any specimens were obtained. However, it is quite possible that the housefly was responsible for this infestation as well.

Still another occurrence of housefly larvae in infant's bedding came to light on Oct. 2, when the agricultural representative for Huron County at Clinton sent in twenty-four preserved housefly larvae. These larvae had been brought in to him by a lady who had found them on a blanket in the baby's carriage.

From what has been mentioned above, it may be concluded that the housefly can definitely come through its entire life cycle with no other nutrient material than human urine; that the housefly will probably not lay its eggs on surfaces dampened with water alone and containing no nutritive material; that the apparent increase in the infestations of housefly larvae in infant bedding is possibly due to the shortage of rubber sheeting and the consequent increased wetting of the baby's bedding with urine.

THE IDENTITY OF A BORER ATTACKING PEACH TREES IN THE OKANAGAN VALLEY OF BRITISH COLUMBIA

Peach trees throughout the Okanagan are frequently attacked by a borer which has been generally referred to in the past as *Sanninoidea exitiosa* Say. It is doubtful, however, if specimens of it were ever submitted for authoritative determination prior to 1940.

Moths bred from larvae taken at Summerland and Trepanier in the southern Okanagan during 1940 and 1941 were submitted to the Division of Entomology, Ottawa and were determined by Dr. J. McDunnough as *Sanninoidea graefi* (Beut.) In a note on the species he states "that *graefi* can be distinguished in the male sex from the closely allied *exitiosa* by the broader dark outer marginal area in the forewings. The females, especially when they are orange-banded as in the form *barnesi*, are very difficult to separate."

It is interesting that the correct identity of this apparently common pest has gone so long unrecognized.

E. P. Venables,
Vernon, B. C.

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